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Medicare's Prospective Payment System

Strategies for Evaluating Cost, Quality, and Medical Technology

Summary

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Foreword

Twenty years ago, Congress made a major commitment to securing older Americans' access to acute medical care with the creation of Medicare. Subsequent legislation extended the Medicare program to disabled people and to victims of end-stage renal disease. Medicare has been an unquestioned success in reducing financial barriers to health care for its beneficiaries, but the program's costs have risen rapidly.

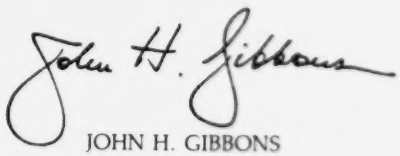
Medicare's payment methods have discouraged doctors, hospital managers, and patients from making cost-effective decisions regarding the use of medical technology. Retrospective cost-based hospital reimbursement was particularly troublesome and, most would agree, inflationary.

Congress ended cost-based reimbursement for inpatient hospital care for Medicare beneficiaries with the creation of Medicare's prospective payment system (PPS) in 1983. The new hospital payment system has reversed the financial incentives away from the provision of more care for hospitalized patients to the provision of less care. Now, the Nation needs to know what this radical change in financial incentives is doing to the quantity and quality of health care received by Medicare beneficiaries, and to the effectiveness of Medicare resources.

Early in 1984, two committees of Congress, the Senate Committee on Finance and the Senate Special Committee on Aging, asked OTA to conduct an assessment that would identify potential economic and health-related effects of PPS and develop a series of strategies for an evaluation of the most important effects.

In this report, OTA arrays the possible effects of PPS on the health care system and assesses the extent to which these effects can be measured. Potential PPS impacts are summarized, and critical evaluation questions are identified for each impact area. In addition to identifying specific studies that would address the critical evaluation questions, OTA also attempted to put the studies in a priority order, based on their cost and feasibility.

OTA was guided in the study by an advisory panel chaired by John Eisenberg. Drafts of the report and several working papers prepared as background were reviewed by members of the advisory panel, members of the OTA Health Program Advisory Committee, and other experts in the Federal and State governments and in health policy research. We are grateful for their assistance. Key OTA staff were Judith Wagner, Anne K. Burns, Mary Ann M. Hughes, Cynthia P. King, and Elaine J. Power.



JOHN H. GIBBONS
Director

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Advisory Panel on Medicare's Prospective Payment System: Strategies for Evaluating Cost, Quality, and Medical Technology

John Eisenberg, *Panel Chair*
Associate Professor of Medicine
Hospital of the University of Pennsylvania

John R. Ball
Associate Executive Vice President for Health and Public Policy
American College of Physicians
Washington, DC

Morris Collen
Consultant
Department of Medical Methods Research
Kaiser-Permanente Medical Program
Oakland, CA

Helen Darling
Director
Human Resources Studies
Government Research Corp.
Washington, DC

Judith Feder
Center for Health Policy Studies
Georgetown University

Susan B. Foote
Assistant Professor
School of Business Administration
University of California at Berkeley

Anthony J. Gigliotti
President
Chief Operating Officer
United Hospitals, Inc.
Cheltenham, PA

Melvin Glasser
Director
Health Security Action Council
Washington, DC

Henry Grabowski
Department of Economics
Duke University

Rosalinda Haddon
Assistant Director
Newark Beth Israel Medical Center
Newark, NJ

Mark Hornbrook
Senior Investigator
Center for Health Research
Kaiser-Permanente, Northwest Region
Portland, OR

Ronald Hurst
Manager, Health Care Planning
Caterpillar Tractor
Peoria, IL

Judith Lave
Professor
Department of Health Economics
University of Pittsburgh

Barbara J. McNeil
Professor of Radiology and Clinical Epidemiology
Director, Center for Cost-Effective Care
Harvard Medical School
Brigham and Women's Hospital

Heather Palmer
Associate Dean for Students
Associate Professor of Health Services
Department of Health Policy and Management
Harvard School of Public Health

William Rial
Swarthmore, PA

Richard Riegelman
Associate Professor of Medicine
and Health Care Sciences
George Washington University
School of Medicine

Leonard Saxe
Associate Professor of
Psychology
Center for Applied Social Science
Boston University

Stephen Shortell
Professor of Hospital and Health
Service
J.L. Kellogg Graduate School of
Management
Northwestern University
Evanston, IL

Donald Sutherland
Director
Investor Affairs
E. I. du Pont de Nemours & Co.
Wilmington, DE

Bruce Vladeck
President
United Hospital Fund of New
York

John E. Wennberg
Professor
Department of Community and
Family Medicine
Dartmouth Medical School

James Young
Vice President and Medical
Director
Blue Cross/Blue Shield of
Massachusetts

OTA Project Staff—Medicare's Prospective Payment System: Strategies for Evaluating Cost, Quality, and Medical Technology

Roger C. Herdman, *Assistant Director, OTA*
Health and Life Sciences Division

Clyde J. Behney, *Health Program Manager*

Judith L. Wagner, *Project Director*

Anne Kesselman Burns, *Analyst*
Mary Ann M. Hughes, *Research Assistant*
Cynthia P. King, *Analyst*
Elaine J. Power, *Research Analyst*
Kerry Britten Kemp, *Health and Life Sciences Division Editor*

Virginia Cwalina, *Administrative Assistant*
Beckie I. Erickson, *PC Specialist/Word Processor*[1]
Diann G. Hohenthaner, *PC Specialist/Word Processor*
Brenda L. Miller, *PC Specialist/Word Processor*[2]
Carol A. Guntow, *Secretary/Word Processor Specialist*

Contractors

Mary Ann Baily, *George Washington University*
Judith Barr, *Northeastern University*
Matthew Farber, *West Virginia University*
Marvin Feuerberg, *Washington, DC*
Stanley Finklestein, *MIT Sloane School of Management*
Bernard Friedman, *Northwestern University*
Kathleen Lohr, *Rand Corp.*
Peter McMenamin, *Washington, DC*
Ross Mullner, *American Hospital Association*
Jerri Perkins, *Perkins & Perkins Inc.*
Elliott Pickar, *Rockville, MD*
Neil Powe, *University of Pennsylvania*
Sankey Williams, *University of Pennsylvania*

[1]Until August 1985.
[2]Until January 1985.

Medicare's Prospective Payment System:
Strategies for Evaluating Cost, Quality, and Medical Technology

INTRODUCTION

In 1983, Congress passed a law that radically changed Medicare's method of payment for inpatient hospital services. The Social Security Amendments of 1983 (Public Law 98-21) mandated an end to cost-based reimbursement by Medicare and initiated a 3-year transition to a prospective payment system (PPS) for inpatient hospital services. The system mandated by this law is based on fixed per-case payment rates for patients in 468 diagnosis-related groups (DRGs).

The ultimate objective of Medicare's PPS is to reduce Medicare's outlays for inpatient hospital care while maintaining an acceptable level of quality and access for beneficiaries. This goal is to be sought through a fundamental restructuring of the financial incentives facing hospitals. Medicare's PPS is a striking change from the previous payment system, providing an entirely new set of incentives relating to medical technology[1] adoption and use by hospitals and other health care providers.

One incentive under PPS is for hospitals to reduce the cost of treating a patient over the course of a hospital stay, in some cases by reducing the length of that stay. PPS diminishes the financial incentives for hospitals managers and physicians to provide additional technologies (except where they lower per-case costs to the hospital), because it encourages such providers to weigh explicitly the benefits of those additional services against their added costs. Because payment is per admission, a second incentive is for hospitals to increase the number of admissions, particularly those that appear to be profitable. A third incentive under PPS is for hospitals to develop new sources of revenue by offering services not subject to DRG payment restrictions. All other incentives and resulting changes in the patterns of technology use arise from these three basic incentives.

Although the direction of the incentives under PPS and some of the resulting impacts were predicted by the designers of the new payment system, the assumptions behind them are largely untested. These uncertainties have not discouraged many observers from predicting

[1]OTA defines medical technology as the drugs, devices, and medical and surgical procedures used in medical care, and the organizational and supportive systems within which they are provided.

serious undesirable results of PPS on patients' access to and quality of health care, on the rate of introduction of new technologies into the practice of medicine, and on the level of clinical research in this country. **The widespread concern that Medicare's PPS could pose a substantial threat to the health care system has made it a highly visible issue and argues for a deliberate strategy for development of valid and timely data on the actual impacts of PPS as they occur.**

Congressional awareness of potential problems with PPS was evident even as the law establishing the system was drafted, and some of the problems are explicitly addressed in the Social Security Amendments of 1983. For example, the PPS law mandated that the Secretary of the Department of Health and Human Services (DHHS) prepare annual reports on the impact of PPS through 1987.

Access to valid information on the impacts of Medicare's PPS is so vital, however, that two committees of Congress, the Senate Committee on Finance and the Senate Special Committee on Aging, asked OTA to conduct an assessment that would identify: 1) the *types* of economic and health-related effects, related to medical technology, that might result from implementation of Medicare's PPS; and 2) a series of strategies for congressional consideration that would provide an evaluation of the most important effects.

This report presents the results of OTA's assessment. It is not an evaluation of PPS; rather, its primary purpose is to identify the kinds of information that are required to give Congress and the American public an accurate and timely view of the impacts of Medicare's PPS.

Scope of the Report

This report arrays the possible effects of Medicare's PPS on the U.S. health care system and assesses the extent to which these effects can and should be measured. **The effects of PPS most relevant to the performance of the health care system are effects on the *cost* of providing medical care and effects on the *health benefits* received from that care.**

Unfortunately, the direct measurement of health benefits is infeasible; therefore, incomplete, imperfect, and overlapping proxy measures must be used. OTA chose four PPS impact areas to serve as proxy indicators of health benefits: quality of care, access to care, technological change, and clinical research.

These PPS impact areas are discussed separately, but there is a great deal of overlap and interaction among them. The most important concern about the content of care in relation to the health benefits it provides is the quality of that care. Yet quality and access are

interrelated, since the same number and mix of services can provide wide variations in access to care if the quality of that care differs widely. Also, the content of medical care (and therefore its costs and benefits) is greatly influenced over time by the direction and rate of technological change and clinical research.

Although the emphasis in this report is on methods for evaluating the ultimate impacts of Medicare's PPS on cost, quality, and the like, changes in the behavior of providers and patients that are brought about by PPS will clearly affect ultimate impacts. This report examines the need for studies of PPS impacts on the organization and utilization of health care services in the context of the ability of such studies to provide useful information on the ultimate benefits and costs of PPS.

Changes in benefits and costs due to PPS are bound to vary among patients, payers, and providers. These redistributions of benefits and costs among the members of society are even more important than PPS impacts on society as a whole, because they have major implications for the equity of PPS. OTA has been mindful of the importance of such distributional impacts in each of the areas discussed.

Certain areas of impact are beyond the scope of this study. PPS has the potential to affect the livelihoods of many people through its influence on patterns of employment in health care and related industries. To the extent that such employment changes affect health costs and benefits, they are captured in this study. But employment shifts require serious public policy attention in their own right. For example, if PPS leads to major layoffs of unskilled hospital personnel, what alternative employment opportunities will be available? Such questions are embedded in larger issues of labor force policy and are beyond the scope of this study.

Also beyond the scope of this study is the effect of PPS on the owners of health care and related businesses. PPS impacts on the health product manufacturing industries, for example, are implicit through their effect, if any, on research and development and, hence, technological change in medicine. Such impacts are not considered for their own sake. Similarly, the effect of PPS on patterns of for-profit versus not-for-profit health care institutions is considered only in the context of PPS impacts on quality and access.

Finally, this report does not directly address the impacts that PPS may have on the quantity and quality of health professions education. These effects could well be both immediate and dramatic. Like all other impacts, however, PPS effects on medical and nursing education are important insofar as they alter the ultimate benefits and costs of health care over the years. Assessment of these ultimate im-

pacts should detect the influence of changes in health professions education. However, the influence of educational changes on health benefits and costs may not be discernible for many years. Thus, although the complexity of the subject precluded detailed discussion of educational effects in this study, the potential delay in detecting their ultimate impacts argues for early attention to the effects of PPS on education, accompanied by an assessment of the implications for health benefits and costs.

FINDINGS

Potential PPS Impacts

A central objective of this study has been to identify critical evaluation questions that need to be addressed with respect to PPS impacts on five important dimensions of health system performance:

- expenditures and costs,
- quality of care,
- access to care,
- technological change, and
- clinical research.

Such questions arise from an analysis of the incentives inherent in the structure of PPS relative to cost-based reimbursement. New incentives leading to alterations in the behavior of providers and patients will ultimately affect the performance of the U.S. health care system.

The changes in the health care system brought about by Medicare's PPS will result from a combination of three aspects of PPS:

- that it is a system of expenditure control,
- that it pays hospitals by the case rather than by the day or service, and
- that it uses DRGs as the system of classifying patients for payment purposes.

It is difficult to disentangle the effects of each of these three components of PPS from one another. Many of the changes that occur as a result of PPS might well have come about through any system that successfully controls the aggregate level of Medicare expenditures for hospital care. Other changes, such as reductions in length of hospital stay, can be expected under any per-case payment method. Still other effects on the availability and use of technologies for specific patients can be traced to the peculiar characteristics of the DRG patient classification system.

As a system for classifying hospitalized patients into a limited number of mutually exclusive and exhaustive categories, the DRG sys-

tem necessarily involves grouping together patients with heterogeneous medical and surgical needs. The DRG patient classification system is based on diagnostic and procedural codes of the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). The way in which medical technologies, particularly new ones, are coded under ICD-9-CM and then incorporated into the DRG system determines not only the kinds of patients that are likely to be profitable to hospitals but also the profitability of new technologies. OTA found, for example, that a new technology that reduces per-case cost could actually reduce a hospital's profit if its use places the patient into a lower priced DRG. Conversely, a cost-increasing new technology could increase hospital profits if its use would place a patient into a more highly reimbursed DRG with a sufficiently higher rate of payment. Other patient classification systems—for example, a system based on the physiological condition of the patient at admission—might offer very different specific incentives with regard to the use and adoption of technology.

When the three aspects of PPS just mentioned are taken together, hospitals can be expected to pursue various strategies, among them, for example:

- increasing hospital admissions, particularly those that are profitable under DRGs;

Photo credit: Fairfax Hospital Association

The incentive provided by PPS to increase interhospital transfers may increase quality of care if the receiving hospital is actually a more appropriate source of care for the patient, yet it may decrease quality by overloading stressed hospitals.

- increasing readmissions and interhospital transfers;
- increasing discharges to nursing homes;
- integrating hospital services with noninstitutional services; such as nursing homes; home health care agencies;
- increasing specialization of services;
- increasing hospital diversification into provision of unregulated health services;
- "upcoding" diagnoses and procedures reported for payment purposes; and
- decreasing cost per admission (through reductions in lengths of stay, ancillary service use, supply prices, or staffing levels).

Table 1 summarizes the relationship between the predicted changes in hospital behavior and the five dimensions of health system performance identified earlier. Note that specific PPS incentives, such as the incentive to increase hospital admissions, may influence several key dimensions at once. Moreover, the direction of impact is not always completely known or uniform across hospitals or patients. In some cases, the incentives are so complicated or mitigated by other factors that the direction of impact cannot be predicted; in others, negative impacts on some people are matched by positive impacts on others.

The sparse evidence on changes in the health care system after the first year of PPS pertains primarily to changes in the utilization and organization of health services. Furthermore, the evidence from the first year is tentative, because not all hospitals were covered by PPS for the entire year and only 25 percent of hospitals' payments were based on DRG prices. Although none of the observed changes can be solely attributed to PPS, several are strong enough to infer at least partial causation by PPS. The average length of hospital stay for Medicare beneficiaries, for instance, has been declining for over a decade, but it took a further radical drop during 1984 that is probably mainly due to PPS. Changes in hospital management priorities, reductions in staffing, the accelerated move toward automated hospital information systems, and an increase in hospital marketing also appear to have been influenced by PPS. On the other hand, the expected increase in hospital admissions did not occur. The failure of this predicted change to occur under PPS implies that certain hospital strategies may take time to develop, that hospital managers' power to influence physicians' behavior may be limited, or that the many other changes taking place simultaneously with the implementation of PPS either enhance or dilute the effects of the new payment system.

The evidence of PPS impacts thus far illustrates the lack of linkages between measured effects (e.g., length of stay, admissions) and the critical impacts (e.g., quality, access). For example, although there is widespread anecdotal evidence that patients are being discharged from the hospital in a sicker condition than before PPS, there is no clear evidence to indicate whether the ultimate impact on the quality of care for those patients is good or bad.

Potential for Evaluation

The ultimate objective of PPS is to reduce Medicare's outlays for inpatient hospital care while maintaining an acceptable level of quality and access to care for Medicare beneficiaries. The intended consequences of the new payment system are the elimination of hospital care that offers too little in the way of patient benefits and the organization of hospital operations to provide the necessary care in the least expensive manner. Thus, PPS rests on the assumption that some part of the health care delivered in hospitals prior to its introduction was unnecessary or was inefficiently produced. A great deal of evidence in the medical literature supports this assumption. If the assumption is true, cost containment might be achieved without sacrificing patients' health or welfare. Indeed, PPS could actually improve quality and access.

How hospitals and other providers actually will respond to the financial incentives inherent in PPS is by no means well understood. Hospitals' responses will depend as much on their own goals and constraints as on the economic incentives of the system. The efficiency with which not-for-profit hospitals—which constitute the vast majority of hospitals—operate, for example, may be more affected by the overall stringency of the Medicare hospital payment system than by the specific design of the prospective payment system. Also, PPS alters hospital incentives in ways that may conflict with each other, thus leading to unintended and possibly undesirable consequences. These interactions are complex and the Nation has little prior experience with payment systems like PPS. **Thus, the magnitude and direction of PPS effects on health care costs and benefits cannot be predicted with confidence.**

The impacts of PPS certainly will not be distributed uniformly across society. Some people will be particularly vulnerable to the outcome of PPS incentives. Some vulnerable groups whose access to and quality of care are more likely to be jeopardized under PPS are obvious—very old people, alcoholics and mentally ill people with medical problems, and disabled people. Other groups in particular

Table 1.—Summary of Potential PPS Impacts on Five Dimensions of Health System Performance

Predicted changes in hospital behavior	Potential impacts on: Expenditures and costs	Quality of care	Access to health care	Technological change and clinical research
Cost per admission (down)	May either increase or decrease total Medicare program expenditures	May increase or decrease quality	May increase or decrease access	
Length of stay (LOS) (down)	May either increase or decrease total Medicare program expenditures	May increase psychological benefits to patients and lessen chance of iatrogenic events; but may also result in discharging sicker patients	May decrease access to necessary hospitalization for patients discharged early; but may also increase access for patients who need to get into hospitals with high occupancy rates	May increase research on and adoption and use of technologies that lower costs by lowering LOS; may decrease development and diffusion of those that raise LOS
Ancillary services (down)	May either increase or decrease total Medicare program expenditures	May decrease use of unnecessary services and decrease risk of diagnostic tests and invasive procedures; but may also decrease use of necessary technologies	May decrease access to necessary services	May increase development and diffusion of technologies that permit fewer or less frequent ancillary services; may decrease development and diffusion of those that require more
Prices of materials and supplies (down)	Decreases hospital costs	No effect	No effect	May decrease R&D by private industry
Use of less expensive materials and supplies	Decreases hospital costs	May increase use of less effective materials, devices, and supplies	No effect	May increase development and diffusion of supply technologies (such as wound dressings) that lower costs; may decrease development and diffusion of those that raise them
Staffing levels (down)	May either increase or decrease total Medicare program expenditures	May decrease use of specialized personnel when needed	May decrease access to special personnel, such as social workers or speech therapists	May increase research on and adoption and use of technologies that are less labor-intensive; may decrease development and diffusion of those that are more labor-intensive
Admissions (up)	Increases Medicare Part A program and beneficiary expenditures; may increase or decrease Part B expenditures	May build specialty in particular DRGs in hospital; but may also increase iatrogenic events	Increases access to hospital care	May increase clinical research and technology adoption and use in profitable DRGs; may decrease that in unprofitable ones
Readmissions (up)	Increases Medicare Part A program and beneficiary expenditures; may increase or decrease Part B expenditures	May decrease quality if diagnosis or treatment is delayed	May increase or decrease access to appropriate care	No effect

Table 1.—Summary of Potential PPS Impacts on Five Dimensions of Health System Performance—Continued

Predicted changes in hospital behavior	Potential impacts on: Expenditures and costs	Quality of care	Access to health care	Technological change and clinical research
Transfers (up)	Increases Medicare Part A program and beneficiary expenditures; may increase or decrease Part B expenditures	May increase quality through specialization in hospital; but may also decrease quality by overloading stressed hospitals	May increase or decrease access for particular populations, such as poor, very old, alcoholic, or mentally ill patients	No effect
Discharges to:				
Nursing homes (up)	May either increase or decrease total Medicare program and beneficiary expenditures	May decrease use of unnecessary care in hospital; but may also increase severity of illness of patients in nursing homes which could lead to greater demands on nursing staff and lower quality of care	May decrease access to necessary higher levels of care; but may also increase access for Medicare beneficiaries to appropriate lower levels of care. Access to lower levels of care for Medicaid beneficiaries may decline	May encourage more clinical research in nursing home settings
Home health care (up)	May either increase or decrease total Medicare program and beneficiary expenditures	May increase psychological benefits for patients and families; but may also result in sicker patients being cared for at home, possibly less effectively	May decrease access for Medicare beneficiaries to necessary higher levels of care; but may also increase access to appropriate lower levels of care	May encourage more clinical research in home settings; may increase development and diffusion of technologies that can be used at home
Vertical integration of services (up)	May either increase or decrease total Medicare program and beneficiary expenditures	May increase use of appropriate level of services; but may also lead to inappropriate placements	May decrease access to necessary higher levels of care; but may also increase access to appropriate lower levels of care	May increase diffusion of traditional inpatient technologies into outpatient and home settings
Specialization of services (up)	May decrease per capita health care expenditures	Increases quality through increasing volume of services	May increase access to special services for some patients; but also may decrease access for parts of the population	May encourage research on and adoption of technologies in hospital's area of specialization in order to enhance hospital's reputation
Upcoding (up)	Increases Medicare Part A expenditures	No effect	No effect	May encourage adoption and use of technologies that permit patient to be classified into a higher paying DRG (when resulting additional reimbursement is greater than additional cost

SOURCE: Office of Technology Assessment, 1985.

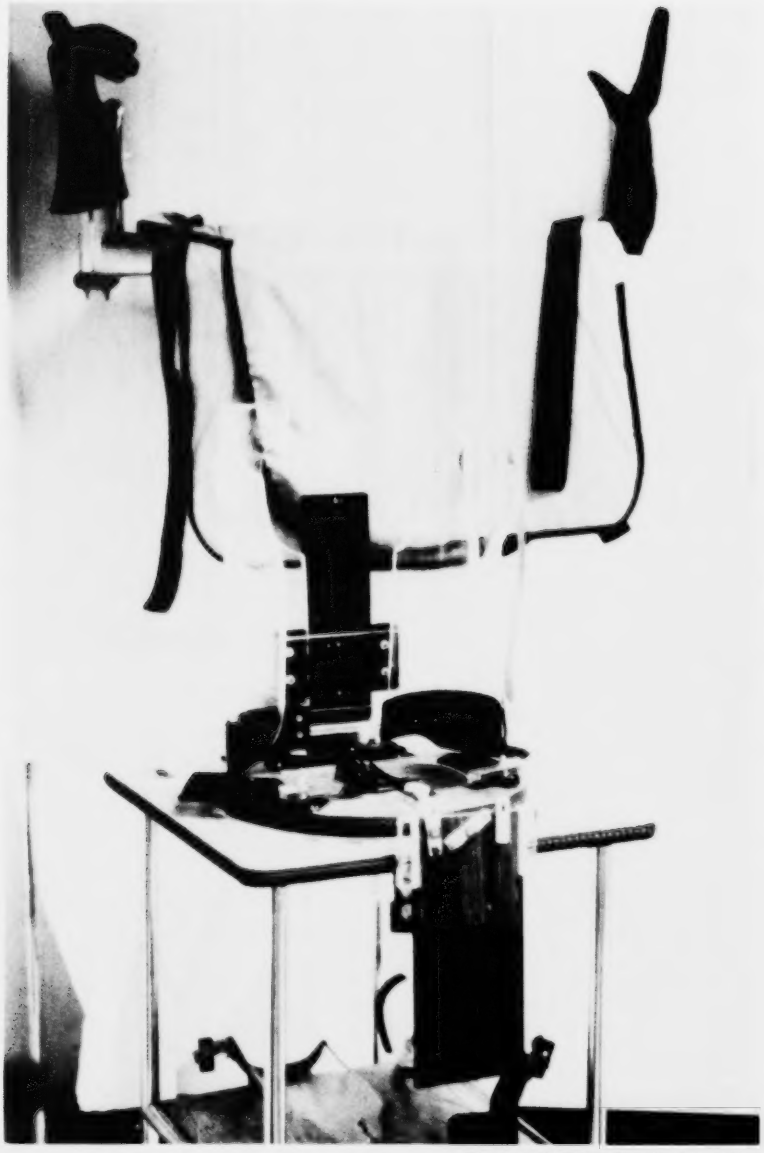

Photo credit: Fairfax Hospital Association

PPS provides an incentive to provide fewer ancillary services, such as radiology, during each inpatient stay.

Photo credit: Fairfax Hospital Association

The impacts of PPS will not be distributed uniformly across society. Special attention needs to be paid to those groups most likely to be vulnerable to decreased access to quality care, including very old people, alcoholic and mentally ill people, and disabled people.

DRGs or seeking care at particular kinds of hospitals may be equally vulnerable. The distribution of PPS impacts among affected groups is as important as its aggregate impacts. For this reason, **a strategy for evaluating PPS impacts should include specific plans for identifying those groups most likely to be vulnerable to negative consequences of PPS and monitoring its effects on them.**

Since monitoring for negative consequences alone would give a biased picture of PPS, however, **it is equally important in the long run to develop plans for a balanced assessment of the full range of PPS effects, positive as well as negative.**

Any PPS evaluation plan must take into account the fact that the effects of PPS will emerge over time. The adaptation to the new system's financial incentives will require major changes in the way that the health system is organized and in the way physicians and hospital managers behave when providing hospital services. Such alterations in behavior do not occur overnight. Some may take many years to develop. Although certain early changes in the health care system may serve as valid early warning indicators of important long-

run effects of PPS, **a mature assessment of PPS can be made only after a substantial period of time has elapsed, perhaps as many as 5 years.** However, now is the time to establish appropriate data collection strategies and monitoring systems so that information is available for such assessments.

The ultimate effects of PPS on health benefits—as represented by quality, access, technological change, and clinical research—and health care costs and expenditures will occur through effects on the utilization and organization of health care services. **Changes in the utilization and organization of health care services are important indicators—but by themselves insufficient measures—of ultimate PPS impacts on health benefits and costs. Without more detailed analyses of how any observed changes in the utilization and organization of services affect the benefits and costs of health care, little can be said about the extent to which PPS has achieved its objective.**

The importance of evaluating PPS notwithstanding, there are many obstacles to achieving an accurate and balanced view of the new system's impacts. Concepts such as quality, access, and technological change are difficult to make operational. The lack of good impact measures necessitates the use of crude measures whose relationship to the concepts of quality or access is often tenuous. Limitations of existing databases require further compromise in the selection of impact measures or, if the limitations are not accepted, expensive studies involving the collection of new data directly from patients or other sources of information.

More importantly, **the feasibility of attributing observed changes in the health care system to PPS is limited by the fact that PPS is not the only change underway in the health care system.** The health care system has been undergoing rapid change in the past 5 years and continues to be dynamic. Simultaneous influences—including changes in the supply of physicians, increasing competition in health care, and concurrent changes in Federal and State health policy—confound researchers' ability to attribute many changes in the health care system directly to PPS. **Consequently, the effects of PPS on the benefits and costs of health care and their distribution throughout society will never be fully understood.** The most that can be expected is that those effects with the strongest hypothesized direct links to PPS can be observed and tentatively related to PPS. Yet verifying the existence of changes in quality, access, etc., is possible and important in its own right. Changes in health benefits and health status frequently require a policy solution, even when the cause of the changes cannot be definitely determined.

Whatever its limitations, evaluation is time-consuming and costly, particularly the kind that attempts to measure changes in quality of care, access to care, and technological change. The design and conduct of such studies require personnel and funding sufficient to support them. Even if federally sponsored evaluation studies are performed by outside grantees or contractors, adequate staffing at sponsoring agencies is required to plan, administer, and oversee the projects. For PPS evaluation to succeed, a commitment is needed to the development and maintenance of databases that can be useful in monitoring the state of the health care system.

At present, the funds and personnel necessary for the conduct of a comprehensive evaluation of PPS do not appear to be available within any Federal agency. The Health Care Financing Administration (HCFA), which has been assigned the responsibility for preparing the congressionally mandated annual impact reports, is using existing databases where possible to address issues of quality and access and has devoted some funds to the development of additional databases and impact measures that can be used for this purpose. However, the amount of funding and number of staff positions currently available for an evaluation of PPS within HCFA are inadequate to meet the information needs identified by OTA. Further budget cuts for HCFA's Office of Research and Demonstrations (ORD) in fiscal year 1986 would exacerbate the problem.

OPTIONS FOR EVALUATING PPS

Several options pertaining to the evaluation of Medicare's PPS are presented below for congressional consideration. OTA has identified two groups of options:

- those pertaining to specific studies that could be undertaken to answer important PPS evaluation questions, and
- those pertaining to the organization of PPS evaluation efforts and the content and organization of databases.

The options for specific PPS studies described below are not specifically numbered as options. Congress could consider any combination of the specific PPS studies described and could mandate or encourage the conduct of the studies it deems sufficiently important. One option would be for Congress to pass legislation mandating and providing funding for the conduct of specific studies by DHHS, the Prospective Payment Assessment Commission (ProPAC), or some other body. Another option would be for Congress to encourage DHHS (e.g., through oversight, in report language, or through some

other mechanism) to undertake certain studies under existing authorities.

In addition to noting options for specific studies, OTA has identified broader congressional options pertaining to the content and organization of databases necessary for PPS evaluation and to the organizational arrangements for the coordination and oversight of PPS evaluation efforts. These options are numbered and are perhaps even more important to consider than the options for specific studies.

Options for Specific Studies

Critical evaluation questions in the areas of PPS impacts on expenditures and costs, quality of care, access to care, technological change, and clinical research are summarized in table 2. Because the range of potential studies to address these questions is a broad one, establishing priorities is necessary.

OTA has identified studies to address these questions and priority categories of studies through an analysis of the strength of the incentives facing providers and their ability or willingness to act on them, the strength of the relationship between these actions and impacts on quality, access, etc., and the feasibility and cost of measuring specific impacts. The result is a three-tiered approach to the identification of studies needed to evaluate PPS:

- ***Category 1:*** **studies that can identify major undesirable impacts on the health care system as a whole or on vulnerable groups.** These studies are either relatively inexpensive to conduct because they rely on existing databases or are so important that they may justify substantial funding.
- ***Category 2:*** **studies that provide a balanced and thorough assessment of impacts on the health care system.** These include those intended to examine both positive and negative results. Their cost is generally (but not always) high because of the need for comprehensiveness and balance.
- ***Category 3:*** **studies to develop methods of measuring important impacts.** These are important for the enhancement of capability to monitor PPS impacts. Cost varies depending on data needs.

Examples of specific studies in the first two categories are summarized in table 2. Category 1 (negative impacts) studies should probably be given the highest priority and include both short- and long-run projects. Studies with the potential for surfacing serious negative consequences of PPS could be useful components of a more balanced and comprehensive assessment of PPS impacts. Some Category 1 studies are currently planned or underway as part of HCFA's

Table 2.—Studies and Data Sources Needed To Address Critical PPS Evaluation Questions

Critical evaluation questions	Studies and priority categories[a]	Data sources	Cost
Expenditures and costs:			
To what extent has PPS been successful in controlling Medicare expenditures for inpatient hospital care?	• Analysis of Medicare admission patterns by diagnosis-related group (DRG) [2]	• Medicare Part A claims file	Low
	• Detailed studies of admissions in DRGs that have undergone substantial changes in volume [2]	• Medical records review • Medicare Part A and B claims data	High
What effect has PPS had on Medicare expenditures for outpatient and nonhospital services?	• Pre/post comparisons of utilization of nonhospital services by Medicare beneficiaries [2]	• Integrated beneficiary-based Medicare claims files	Medium
What effect has PPS had on Medicare beneficiaries' expenditures for health care?	• Periodic assessment of out-of-pocket expenditures by Medicare beneficiaries [2]	• Direct surveys of Medicare patients who have been hospitalized within a specific time • Patient sample identified through Medicare claims files	High
How well does PPS cover the costs of providing inpatient care to Medicare beneficiaries?	• Studies of revenues and costs of treating Medicare beneficiaries [1]	• Medicare Part A hospital billing file (PATBILL) • Medicare cost reports	Low
To what extent are variations among hospitals in profitability of Medicare patients due to factors beyond the hospitals' control, such as variations in severity of cases, the socioeconomic status of the patients, or input prices?	• Studies of revenues and costs by hospital and area characteristics [1]	• Medicare Provider Analysis and Review file • Medicare cost reports	Low
	• Studies of within-DRG differences in case-mix severity among hospital types [1]	• Medical records review	High
Quality of care:			
What, if any, negative effects has PPS had on quality of hospital care for Medicare beneficiaries?	• Pre/post-PPS studies of in-hospital and postdischarge mortality rates [1]	• Medicare Part A claims files • Hospital Insurance Master file	Medium
	• Pre/post-PPS studies of the incidence of drug reactions, decubitus ulcers, postsurgical pneumonia, and falls [1]	• Medical records review	High
	• Pre/post-PPS studies of reasons for second admissions (e.g., unrelated illness, unsuspected problem, surgical complications, premature discharge) [1]	• Medicare claims files to identify readmissions • Medical records review to identify causes	Low High
What is the net effect of PPS on quality of hospital care for Medicare beneficiaries?	• Pre/post-PPS studies of treatment patterns and outcomes for specific disease conditions and patient complexity (e.g., age, income, severity of illness, health status, and comorbidity) [2]	• Medical records review	High
How has PPS affected the quality of care in nonhospital settings of care?	• Longitudinal studies of cohorts of Medicare beneficiaries to track diagnosis, treatment, and recovery of illness regardless of health care setting [2]	• Medicare Part A and B claims • Medical records review • Survey of Medicare patients	High

Table 2.—Studies and Data Sources Needed To Address Critical PPS Evaluation Questions—Continued

Critical evaluation questions	Studies and priority categories[a]	Data sources	Cost
	• Assessment of patient outcomes such as physical functioning, emotional well-being, capacity for independent living, and effects on family members [2]	• Medicare Part A and B claims • Survey of Medicare patients	High
Access to health care:			
How has PPS affected the availability of inpatient hospital care?	• Pre/post-PPS comparison of number of hospital beds by region, State, and county, urban/rural [2]	• American Hospital Association (AHA) Annual Survey of Hospitals • State health planning offices (for within-State areas)	Low
	• Pre/post-PPS comparison of number and geographical distribution of complex facilities (e.g., burn units, intensive care units, and cardiac catheterization labs) [1]	• AHA Annual Survey • Medicare Provider of Service file	Low Low
How have interhospital transfers of Medicare patients changed since the implementation of PPS?	• Pre/post-PPS studies of the number of transfers of Medicare patients [1]	• Medicare Part A claims file	Low
	• Analysis of the medical, demographic, and socioeconomic characteristics of transferred patients [1]	• Medicare Part A claims file • Special survey	Low to high
	• Studies of the origins and destinations of interhospital transfers by type of hospital [1]	• Medicare Provider of Service file • Medicare Part A claims file	Low
Has PPS affected the utilization of inpatient care for vulnerable groups (e.g., alcoholic, mentally ill, disabled, or frail elderly patients)?	• Pre/post-PPS comparison of admissions for each vulnerable group [1]	• Special surveys to identify vulnerable groups • Medical records review (in the case of alcoholic and mentally ill patients)	High
	• Pre/post-PPS comparison of the utilization of special high cost services for vulnerable groups [1]	• Medicare Part A claims file • Population-based surveys	
How has PPS affected the availability and utilization of posthospital care for Medicare recipients?	• Pre/post-PPS comparison of the utilization of skilled nursing facility (SNF) days by Medicare beneficiaries [1]	• Medicare Part A claims file • Population-based surveys	Low
	• Pre/post-PPS study of the utilization of home health care by Medicare beneficiaries [1]	• Medicare Part A claims file • Population-based surveys	Low
	• Studies of the number of SNF beds actually available to Medicare patients within Medicare-certified facilities [1]	• Medicare Provider of Service file	Low
Has the demand for care in Veterans Administration (VA) hospitals increased, and if so, has the increase resulted in longer waiting lists for medical attention?	• Pre/post-PPS comparison of VA Medical Center waiting list reports [2]	• VA central office—hospital inpatient activity reports by each facility, but data not available by age	Low

Table 2.—Studies and Data Sources Needed To Address Critical PPS Evaluation Questions—Continued

Critical evaluation questions	Studies and priority categories[a]	Data sources	Cost
Technological change:			
How does PPS affect the extent and direction of research and development that underlies technological change?	• Monitoring of R&D inputs (dollars) in various sectors of the health care field [2]	• National Science Foundation (NSF) survey	Medium
How does PPS affect the development and diffusion of technologies that lower total Medicare costs? That lower health system costs?	• Case studies of specific technologies. Especially amenable to studies of a few individual technologies [2]	Sources to choose technologies for study: • Food and Drug Administration (FDA) and patent databases • Surveys or consensus panels of experts Sources of data on the technologies themselves: • National Hospital Discharge Survey (diagnosis/procedure codes) • Revisions to CPT-4 • Results of cost-effectiveness studies and clinical trials • Surveys of physicians, hospitals, manufacturers, local planning agencies	Medium[b]
How does PPS affect the diffusion of cost-raising but quality-enhancing technologies?	• Case studies of specific technologies [2]		
How does PPS affect the use of technologies that lower quality of health care relative to alternative technologies available?	• Case studies of specific technologies [2]		
Clinical research:			
How is PPS affecting the level and type of clinical research performed relative to the situation under cost-based reimbursement?	• Analysis of relative costliness of patients on clinical research protocols (compare subject areas) [2]	• Hospital billing data; patient abstract data; Hospital Cost and Utilization Project database; National Institutes of Health (NIH) records of patients participating in research	Medium to high[c]
	• Analysis of changes in purchasing power of NIH dollars budgeted for clinical trials [2]	• NIH clinical trial data on dollars spent, number of patients, number of trials, number of participating hospitals and investigating personnel	Medium[d]
	• Number and proportion of patients over age 65 on clinical trials (compare across research areas) [1]	• NIH clinical trial data on patient age	Low

[a]Category 1: Studies that can identify major undesirable PPS impacts on the health care system as a whole or on vulnerable groups.
Category 2: Studies that provide a balanced and thorough assessment of PPS impacts on the health care system.
Category 3: Studies whose purpose is to develop methods of measuring important PPS impacts.
[b]Depends on number of technologies studied.
[c]Depending on number and extent of research areas analyzed.
[d]Data exist but are scattered in records of individual institutes and trials.

SOURCE: Office of Technology Assessment, 1985.

annual PPS impact reports mandated by Congress. Others, for example, studies of avoidable negative outcomes in hospitals, detailed studies of vulnerable groups, and case studies of new technologies, are neither underway nor currently planned.

Category 3 (methods development) includes studies in three critical areas:

- *Studies to develop improved methods of classifying patients according to their predicted need for hospital resources.* Although DRGs are at present the patient classification system most practical for use as the basis for a per-case pricing system, their structure has created potential problems in patient selection, fairness to hospitals, and the introduction of new technologies. Moreover, many PPS impact studies require selection of samples of patients with homogeneous resource needs. Improved patient classification systems, even those that may be infeasible for use in payment, could be used in evaluative studies to provide valuable information on the underlying causes of particularly troubling impacts. Comparative studies of the attributes of alternative patient classification systems would enhance this capability.

Photo credit: Fairfax Hospital Association

Studies of changes in the use of home health care due to PPS are a necessary part of evaluating the impact of PPS on the entire health care system.

- *Studies to develop improved techniques for assessing the costs of treating patients.* Current methods of assessing the cost of treating Medicare patients are poor and depend on a cost reporting system that may be inadequate for patient- or DRG-specific estimates. Research into improved methods of estimating the costs of treating patients in specific DRGs and hospitals would improve the ability of the PPS system to operate fairly.
- *Consensus development on measures and standards of quality of care and access to care.* At present, measures that adequately represent quality and access and that are likely to be sensitive to PPS are insufficiently developed. Also, agreement on the extent to which observed changes in such measures constitute acceptable or unacceptable changes in quality or access is needed. Expert consensus development could assist in identifying appropriate measures and making judgments about their acceptability.

Options for Implementing PPS Evaluation

Databases for PPS Evaluation

Problems in routinely maintained Federal databases complicate the task of evaluating PPS. The Medicare databases are rich sources of evaluative information, but their content and organization make analysis difficult and costly.

The Medicare cost reports that hospitals submit annually to their fiscal intermediaries represent a particular problem. These reports are not available to HCFA in a timely fashion or in automated form. Also, their content is vulnerable to change by HCFA without adequate consideration for their usefulness in addressing critical evaluation questions. There is even some question whether the cost reports will survive at all after 1988, when they will no longer be legally required.

The Medicare claims databases are more timely, but the size of the files and their organization precludes easy access for studies, especially those requiring beneficiary-based histories of utilization or outcomes. The development of integrated beneficiary-based databases would enhance researchers' ability to study systemwide impacts of PPS.

Federal health surveys, particularly those designed to periodically monitor the utilization, expenditures, and health status of the U.S. population, do not live up to their potential usefulness for the evaluation of PPS effects because of funding constraints and inadequate attention to the specific data needs of PPS evaluation.

These problems raise three options for consideration by Congress:

OPTION 1: Mandate a review of the Medicare cost reporting system.

The basis for Part A Medicare payment under cost-based reimbursement was the Medicare cost report, which was specifically designed to provide the information necessary to calculate Medicare's payment obligation to the hospital. The cost report format changed with revisions and refinements in the cost-reimbursement method over the years; its content has always been dictated by the need for data for purposes of paying hospitals.

Under PPS, the need for cost data is changing. To the extent that PPS becomes a pricing system, with prices tied to the general economy and not to actual costs, the need for hospital-specific cost data to administer the program will be reduced. (Cost reports will be needed only for estimating passthrough items such as capital, direct teaching, and outpatient costs.) Although the Social Security Amendments of 1983 expressly prohibited the total abandonment of the cost reports before 1988, their content can be changed at the discretion of HCFA (with the approval of the Office of Management and Budget).

As a unique source of cost data at the hospital level, the Medicare cost reports are critical to evaluating the financial effects of PPS on different kinds of hospitals, patients, and payers. Although hospitals differ in some reporting details, the cost reports impose a reasonably uniform format on all hospitals and thereby permit comparative analyses. The level of detail of reporting required for PPS evaluation has not been investigated in detail. The 1984 version of the cost report, for example, includes expenses reported at the departmental level. Whether this level of detail is necessary for accurate estimation of costs by DRG, hospital, and payer or whether an even greater level of detail would be useful are important questions.

A review of the content of the Medicare cost reports by experts in hospital finance, accounting, and economics could lead to a streamlined reporting format that is still responsive to the need for information to evaluate the financial impacts of PPS.

Aside from content issues, there is a problem with the timely availability of data from the cost reports at HCFA. An automated cost report information system, referred to as the Hospital Cost Report Information System (HCRIS), has been incompletely implemented. Cost reports are available from the system with a substantial time delay (at least 3 years at present). Currently, only the final audited reports are entered into the system at HCFA, a practice which de-

lays the availability of data by at least 12 months. More timely cost data would be available from the reports submitted by hospitals prior to auditing, and it appears that these preliminary cost reports would be reasonably accurate for purposes of evaluation.

A review of the Medicare cost report information system, including the HCRIS system, by experts both within and outside of the Federal Government could identify further needs for system developments. In addition, such a group could review the submission and auditing time schedules laid out in law and regulations for their reasonableness under PPS and could consider the advantages and disadvantages of alternatives to universal mandatory cost reporting by hospitals.

OPTION 2: Mandate the development of integrated, beneficiary-based Medicare Part A and Part B databases.

The Medicare databases currently available include data on the use of institutional services (Part A) or physician and other services (Part B), but not both. These unintegrated databases place serious restrictions on attempts to analyze the impacts of PPS on services to beneficiaries systemwide. Only a beneficiary-based database that links Part A and Part B medical claims and enrollment data could follow and compare the entire history of utilization of health services for a sample of beneficiaries. For such a database to be feasible, adequate funding would be necessary.

An integrated Part A-Part B database would be especially important to studies of the impact of PPS on the quality of medical care and on Medicare and expenditures for such care. Studies of PPS impacts on quality of care require a spectrum of data on the full range of services provided to beneficiaries, including hospital admissions, out-of-hospital care, and physician visits. Without this spectrum of data, studies such as analysis of the impact of shorter length of hospital stay on future patient outcome cannot be conducted programwide. Studies comparing beneficiary and Medicare expenditures across services are likewise hampered by the lack of an integrated database. Studies comparing expenditures systemwide, or linking hospital with nonhospital expenditures, cannot be undertaken without a database that includes the full experiences of Medicare beneficiaries in the health care system.

The only file that combines data from Parts A and B at present is the continuous Medicare History Sample File. This file, which contains the utilization history of a 5-percent sample of Medicare beneficiaries, is limited in several respects. First, the inpatient stay section of each beneficiary's record contains only the principal diagnosis

and surgical procedure; accurate DRG assignments are therefore not possible. Second, the ambulatory care record contains no diagnostic or procedural data. Third, as a 5-percent sample, the Medicare History Sample File does not easily lend itself to analyses that require a large sample of beneficiaries with specific combinations of characteristics and medical conditions, as would be required for detailed pre/post-PPS comparisons of quality, access, and expenditures. Finally, there is a substantial time lag in the creation of the file. The latest file available as of June 1985 covered calendar year 1981.

One data system, not yet operational, that promises to link Parts A and B in a flexible way is the Medicare Automated Data Retrieval System (MADRS). This system will retrieve the full array of claims on any beneficiary each year from the various HCFA files, making analysis of systemwide impacts much easier for both intramural and extramural research.

Although MADRS will enable studies on health services, utilization, and expenditures to make comparisons across settings of care, this system has three problems. First, MADRS is a data retrieval and organizing system, not a new database. It links accessible data together and makes them available in one place, but if those data are incompatible or incomparable, it cannot make them less so. Second, MADRS organizes data by year, so examination of the entire history of a Medicare beneficiary still requires tedious organizing of data by beneficiary across all applicable years. Third, even when MADRS becomes operational, its files will include data only from fiscal year 1980 on, thus precluding many comparative studies across time and limiting its usefulness to fairly recent beneficiary history.

OPTION 3: Encourage DHHS to review procedures for national health surveys.

The national population-based health surveys periodically conducted by the Federal Government for statistical purposes are valuable sources of data, but improvements in their content, sampling designs, and completion schedules could make them more useful for the evaluation of PPS impacts. Appending the appropriate information to the Hospital Discharge Survey records, for example, would allow data from this survey to be arrayed by type of hospital.

Some efforts are already underway to improve national estimates of the use and expenditures for health care services. The sponsoring agencies (the National Center for Health Services Research and Health Care Technology Assessment (NCHSR&HCTA), the National Center for Health Statistics, and HCFA) of the 1987 National Medical Expenditure Survey, the successor to the National Medical Care Utilization and Expenditure Survey, proposed to the Office of Manage-

ment and Budget to: sample a higher than average proportion of the elderly population; provide more detailed information on community-based long-term care; and release their first published reports after 1 year, in order to allow for a timely assessment of the impact of PPS. This type of review could be generalized across all national surveys.

A review of national health surveys for changes that would accommodate the needs of evaluation could be accomplished by an interagency task force or by an agency responsible for coordinating PPS evaluation, if one were to exist. Of course, changing national health surveys or making them available on a more timely basis would involve additional costs associated with instrument design, sample selection, and pretesting. Changes also might cause further delay in the timeliness of these surveys, which is already a problem. Thus, the organization responsible for reviewing the surveys would need to weigh the value of additional information against these costs.

Organizational Arrangements for PPS Evaluation

Three questions arise with respect to the organization of PPS evaluation:

- What organizations within or outside of the Federal Government should be responsible for conducting PPS studies?
- What funding mechanisms should be used to carry out the needed research?
- How can the total PPS evaluation effort be coordinated?

The first two questions must be answered on a study-by-study basis. At present, HCFA maintains the major responsibility for evaluation of PPS impacts, since it has been assigned the congressionally mandated annual impact reports within DHHS. As the agency with the most detailed knowledge of and access to the critical databases, HCFA is a natural selection for many PPS studies. Yet some PPS studies might better be handled by other agencies whose interests are not so closely aligned with the implementation of PPS. For example, NCHSR&HCTA has the staff skills and grant mechanisms to manage PPS evaluation studies and is already conducting some research in this area. Of course, the budget of this agency would need to be augmented if NCHSR&HCTA were to substantially expand its capacity without jeopardizing other areas of health services research. In addition, the role of ProPAC in evaluating the impacts of PPS is unclear, but ProPAC has been strongly encouraged by at least one congressional committee to take on this task and intends to comply to the extent that its budget allows.

The most important organizational question is the third. The difficulty of ensuring that appropriate studies are undertaken, avail-

able data are used efficiently, the knowledge of those most qualified and objective is tapped, and adequate resources are devoted to evaluation suggests that continual coordination and oversight of the evaluation process is desirable.

The importance of PPS evaluation can be underscored by congressional recognition that the impacts of PPS will continue to work themselves out well beyond 1987, the date of the last mandated annual impact report. The observations above lead to options 4 and 5 below.

OPTION 4: Appoint one Federal agency to coordinate and oversee the organization of PPS evaluation.

The functions of a coordinating organization could include the following:

- assessing the feasibility and cost of alternative studies in relation to their importance,
- developing an annual PPS evaluation agenda,
- recommending an annual PPS evaluation budget,
- identifying the most appropriate organizational sponsors for specific studies,
- recommending the most appropriate funding mechanisms,
- recommending funding levels for individual studies,
- overseeing and coordinating access to needed data,
- overseeing and coordinating changes in data systems to enhance the ability to evaluate PPS,
- reviewing the content of specific studies for their scientific validity, and
- serving as a clearinghouse for both public and private sector studies.

If an executive branch agency were to be appointed, the most logical candidates would be agencies within DHHS. The Office of the Assistant Secretary for Planning and Evaluation has traditionally maintained a coordinating role with respect to evaluation research. Two other possible organizations within DHHS are NCHSR&HCTA and HCFA. NCHSR&HCTA has extensive experience in supporting intramural and extramural research of this kind, has staff with technical skills to carry out the function, and is currently coordinating the PPS-related research of the Public Health Service. However, NCHSR&HCTA is low in the DHHS organizational hierarchy and might therefore have difficulty undertaking an oversight role. HCFA has both program and research expertise. However, if HCFA or any of the other components of DHHS is assigned the task of coordinating the PPS evaluation, it will be important to consider their inherent lack of objectivity, since they are part of the Department implementing PPS.

Congressional agencies, such as the Congressional Budget Office, the Congressional Research Service, the General Accounting Office, or OTA, would be capable of providing the oversight that is necessary, particularly if staff with program evaluation skills were assigned the responsibility, but the missions of these offices are not generally congruent with such a responsibility.

ProPAC has an informal congressional mandate to provide a comprehensive evaluation of PPS (Report 98-911 on H.R. 6028), but ProPAC has a budget that cannot begin to meet these expectations. As a substitute for such a full-scale PPS evaluation, ProPAC's legislated function could be expanded to include coordination and oversight of PPS evaluation activities throughout the Federal Government. As the body with responsibility for recommending relative and absolute DRG prices, however, ProPAC would not be totally disinterested in the outcome of an evaluation of PPS.

Private organizations with experience in health policy research and evaluation are probably not good candidates for the role of coordinator. Such organizations would have low access to information and databases held by Federal agencies and inadequate influence over the evaluation process.

Any organization that is assigned the coordination and oversight functions will need highly skilled staff, adequate resources, and sufficient influence over the evaluative process if it is to perform the functions successfully.

OPTION 5: Extend the requirements for the PPS annual impact reports by DHHS beyond 1987.

The annual impact reports mandated in the Social Security Amendments of 1983 were intended to provide critical information on PPS impacts. Eliminating them after 1987, as is now mandated, seems to waste an opportunity to complete a PPS evaluation because the impacts may develop over a longer period of time.

Potential problems with extending the impact reports for a longer period of time include the administrative burden and the cost of such reports. If one Federal agency were coordinating and overseeing all PPS evaluation, however, this burden might be somewhat alleviated (see option 4). At this time, the Secretary of DHHS is required by law to submit the annual impact reports to Congress. The responsibility for preparing the reports has been delegated to HCFA, but it does not necessarily have to remain there, especially if a coordinating agency other than HCFA were appointed.

Assessments in Progress as of October 1985

Technology and the American Economic Transition
Western Surface Mine Reclamation
High-Technology Ceramics and Polymer Composites
Technology and Structural Unemployment: Retraining Adult Displaced Workers
International Competition in the Service Industries
Technology Transfer to China
Alternatives for Improving NATO's Defense Response
Technology, Public Policy, and the Changing Structure of American Agriculture
Technologies To Maintain Biological Diversity
Integrated Renewable Resource Management for U.S. Insular Areas
Low-Resource Agriculture in Developing Countries
Evaluation of Agent Orange Protocol
Technology and Indian Health Care: Effectiveness, Access, and Efficiency
Physicians and Medical Technology: Use, Cost, and Payment Methods
Technologies for Determining Mutation Frequencies in Human Beings
Alternatives to Animal Use in Research, Testing, and Education
Reproductive Health Hazards in the Workplace
Life-Sustaining Technologies and the Elderly
Disorders Causing Dementia
Automation of America's Offices
Federal Government Information Technology: Congressional Oversight and Civil Liberties
Intellectual Property Rights in an Age of Electronics and Information
Technologies for Disposing of Waste in the Ocean
Technologies to Control Illegal Drug Traffic
Transportation of Hazardous Materials: State and Local Activities
Science Policy Special Projects

(NOTE: For brief descriptions of these studies in progress, see OTA booklet on "Assessment Activities"—available from OTA's Publishing Office, 224-8996.)

NOTE: Copies of the full report "Medicare's Prospective Payment System: Strategies for Evaluating Cost, Quality, and Medical Technology" can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, GPO stock No. 052-003-01010-1.

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